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HOW I DO IT

Transperineal Ultrasound-Guided Prostate Cryosurgery

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INDICATIONS FOR THE PROCEDURE

Cryosurgery of the prostate with transrectal ultrasound guidance in our institution is indicated mainly as primary therapy of clinically localized prostate cancer and as an alternative to standard radical prostatectomy, external beam radiotherapy, or interstitial radiotherapy. Less frequent indications include a ''salvage'' procedure for patients failing previous radiotherapy, whether it be external beam or brachytherapy or a combination, as well as failures of prior radical prostatectomy. The last indication is the debulking of large local lesions even in the presence of metastatic disease.

PREOPERATIVE PREPARATION

The patient is prescribed to have a single cleansing enema the night before or the morning of the procedure, and he is placed nil per mouth (NPO) for at least 6 hours. Perioperative antibiotic therapy is given usually in the form of cephalosporin parenterally every 8 hours for two or three doses. The anesthesia used is either general or regional, e.g., epidural or spinal.

PROCEDURE

After satisfactory induction of anesthesia, the patient is placed in standard dorsal lithotomy position and rectal bimanual examination is performed. The surgical preparation field includes the suprapubic, genital, and perineal areas. Cystoscopy is performed, either with flexible or rigid instruments, to identify the endoscopic anatomy as well as to look for other pathology such as bladder calculi and/or bladder tumors. With the bladder filled, a suprapubic cystostomy is performed under cytoscopic guidance. Typically the Bard® (Covington, GA) kit is used with a 12 French foley catheter. The patient's bladder is kept full during the procedure, not only for better transrectal ultrasonography but also to keep normal tissue away from the freezing zone. Postoperatively the suprapubic cystostomy tube will be in place for 7–14 days to allow subsidence of surgical reaction and to check for bladder emptying.

Typically, five cryoprobes are placed. Initially a J-tip 0.038'' guidewire is placed into the bladder and the cystoscope removed. A Councill type of foley catheter, usually 20 or 22 French, is placed over the guidewire into the bladder. Transrectal ultrasonography is performed using the Bruel and Kjaer® ultrasound equipment; the prostate is examined for its topography as well as size or volume. A Bookwalter retractor is placed over the pubic area to help suspend the cryoprobes. Using long 18 gauge needles, five J-tip 0.038'' diameter guidewires are placed into the prostate using ultrasound guidance. Typically, two wires are placed anterolaterally, two posterolaterally, and one in the suburethral midline position. Placement of the guidewires is monitored with both transverse and saggital ultrasonography (Figs. 1, 2). After satisfactory position of the guidewires, a cannule-dilator set is placed over each guidewire distal to the prostatovesical junction. After satisfactory placement of the cannulae, the dilators and guidewires are removed, and the Councill urethral catheter is exchanged for a urethral warming device circulating warm fluid through the urethra and bladder without direct patient contact. The first of the cryoprobes is then placed in the cannula, again starting anteriorally and working posteriorally. After proper positioning of the tip of the cryoprobe, usually within 5–6 mm of the prostatovesical junction, the freezing procedure is performed with the Accuprobe® (Cryomedical Science, Rockville, MD) down to a temperature of −50–−70°C to ''stick'' the probe to tissue. After all five cryoprobes are placed and ''stuck,'' fast freezing is performed again starting anteriorally with the posterior probes being placed on fast full freeze only when the ice balls from the anterior

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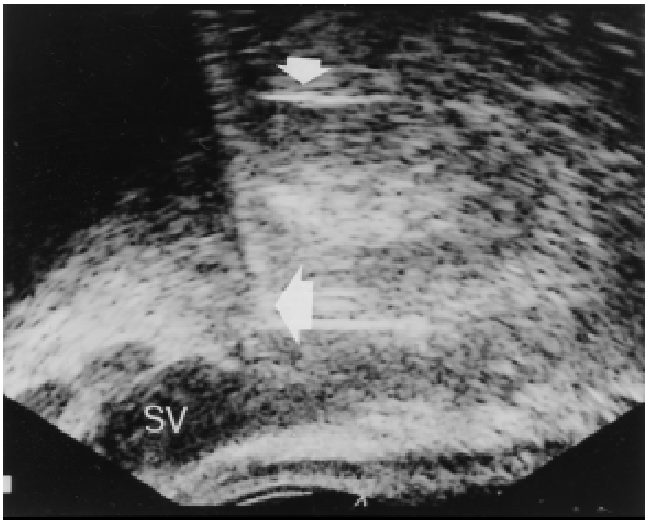

Fig. 1. Longitudinal (sagittal) display of transrectal ultrasonography (TRUS) during placement of guidewires into the prostate. One wire is seen anterior to the seminal vesicle (SV) with acoustic reverberation from its proximal tip (large arrow). A second wire previously placed more anteriorally is seen at the prostato-vesical junction (small arrow).

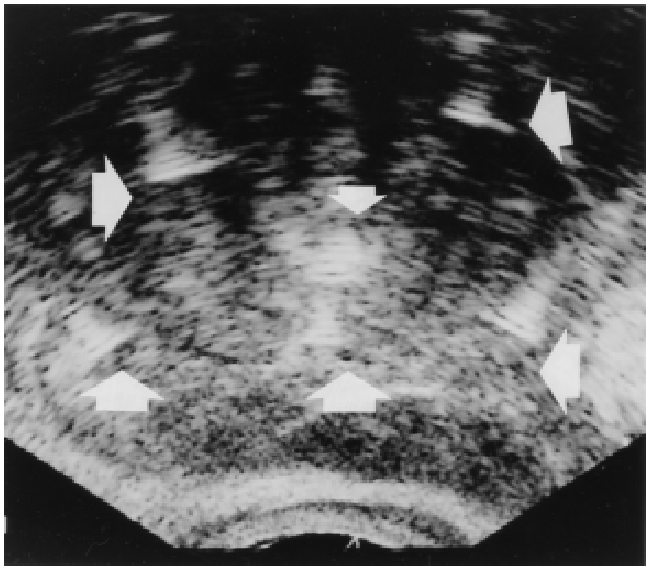

Fig. 2. Transverse display of transrectal ultrasonography during placement of guidewires into the prostate. Five wires are seen peripherally (large arrows) plus an additional guidewire in a urethral catheter centrally (small arrow).

probes begin to reach the posterior probes. The typical core temperatures will be between −180–−195°C. Typical freezing times are 5–15 minutes with monitoring, not only with ultrasound, but by occasional digital palpation per rectum to assess mucosal or rectal wall cooling. Thermacouples are not routinely used for this procedure.

After satisfactory freezing time, the probes are slowly thawed and after some reconstitution of the prostatic tissue, the procedure is repeated for a double or second freeze. Should the prostate volume and anatomy be such that the apex portion is not included in the original two freezes, the cryoprobes will be pulled back to the apex after sufficient thawing has occurred and an apical freeze, either single or double, is performed.

After the final freeze-thaw cycle, the cryoprobes are removed and the perineal puncture sites sutured with fine chromic and plain dressing applied. The urethral warming device is removed and replaced with the Councill foley catheter over the guidewire; both the urethral and suprapubic tubes are irrigated free of blood and blood clots.

POSTOPERATIVE CARE

After the usual stay in the recovery area, patients are discharged home either that same day or the following morning. The urethral foley catheter is removed either the same day or the next day. The patient is prescribed oral quinolones for 2 weeks at normal doses. He is given a voiding trial at home after the first 7–10 days, and the suprapubic tube is removed once his postvoid residual urine is either <100 ml or <25% of total bladder volume. Normal activity is resumed usually after the first week. Follow-up consists of rectal examinations, serum prostate specific antigen determinations, and urinalyses. Biopsies are performed at 6 months, 12 months, and at 2 years, postoperatively.